grassland plants derived from buried seeds are so consistent and so regularly associated with the history of the land that one is irresistibly forced to the conclusion that when arable land is grassed over, a certain number of the seeds are able to retain their vitality for very many years. Many of the seeds die within a comparatively short time after burial, and as time goes on the number of living seeds gradually becomes less, although the evidence goes to show that some seeds will survive burial for at least 58 years. Usually most of the older arable seeds survive in the lower depths of soil where the conditions are less variable, whereas the shorter the time that land has been under grass the greater the proportion of arable seeds that are found near the surface. While the stock of arable seeds is diminishing with the lapse of time, the supply of grassland seeds is being augmented by fresh seeds that are ripened by the surface vegetation and are gradually carried down into the soil. Naturally enough, the greater number of these seeds are found in the upper inches of soil, comparatively few penetrating below the eighth inch."

Miss BRENCHLEY fails to note the much earlier and extensive work (1893–94) of PETER, which is very similar to hers in method and conclusion. She also fails to mention the well controlled work of BEAL and of DUVEL on the longevity of buried seeds, which likewise justifies her conclusions.[8]—WM. CROCKER.

Wound callus and bacterial tumor.—Polar difference in wound callus formation has often been observed in stems, and less frequently in root structure. MAGNUS[9] finds that segments of the root of a half long carrot with which he worked produced a wound callus on the morphologically apical face, but not on the basal face. This occurred whether the apical face was oriented upward or downward in the moist chamber. The callus starts at the cambium ring and spreads centripetally. When the apical face is infected with *Bacterium tumefaciens* the callus development is much greater. When the basal face is infected there is a considerable development of tumors on that face, and this acts in a correlative way to inhibit the normal tumor development in the apical face. MAGNUS also worked with a long fodder carrot. While infection in this form increased the callus development on the apical face of the segments tenfold, it induced very little tumor development on the basal face, and accordingly showed little correlative effect in inhibiting the normal development on the apical face.

MAGNUS offers evidence for the view that the tumor inducing organism in plants is not identical with that in man. He also suggests that certain conclusions of BLUMENTHAL and HIRSCHFIELD on the effect of *Diplococcus* in

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[8] See CROCKER, WM., Mechanics of dormancy in seeds. Amer. Jour. Bot. **3**:99–120. 1916.

[9] MAGNUS, WERNER, Wund-callus und Bakterien-Tumore. Ber. Deutsch. Bot. Gesells. **36**:20–29. 1918.

tumor formation in plants may be wrong because they failed to recognize the polar disposition to callus formation. He thinks the studies on tumor formation in plants will finally throw much light on cancer development.—WM. CROCKER.

Effect of illuminating gas on plants.—WEHMER[10] has studied the effect of passing continuous streams of illuminating gas through the soil bearing potted herbaceous as well as 3–7-year-old woody plants. There was a great difference in the amount of injury, according to the stage of development. In the spring the trees were entirely killed in a relatively short time. This is in general the sort of reaction given by the actively growing herbaceous forms at all times. In late summer and early fall the injury is less marked and is shown mainly by leaf fall, while in the dormant period of winter the trees are very resistant. In the cress the embryo in the resting seed and the seedling stage proved very sensitive. Cuttings stood in gas-impregnated water showed, with few exceptions (*Ilex*), seasonal variations in sensitiveness similar to the plants rooted in soils. In spite of this the author thinks that injury to parts above the soil is in part a secondary result of root injury. The injury is due to toxic conditions of the gas and not to mere displacement of oxygen by the gas, as SORAUER has suggested. The toxic constituents increase or decrease with the conditions that lead to an increase or a decrease in the odor-producing materials. A later paper on the toxic constituents is promised. The author seems to have overlooked most of the literature on the effect of illuminating gas on plants.—WM. CROCKER.

Aeration systems of leaves.—NEGER[11] has earlier spoken of 2 types of leaves on the basis of the nature of their intercellular systems, heterobaric and homobaric. In a recent article he compares a heterobaric leaf to a house with thousands of rooms lacking communicating doors, and a homobaric leaf to a similar house with communicating doors present and all open. In the first type the intercellular system is divided into many small isolated regions by the smaller veins, with the resulting possibility of different air pressure existing in each; while in the second the whole intercellular system of the leaf is connected and therefore the same pressure exists throughout. Most plants with flat leaves have heterobaric leaves, and the size of the individual chambers varies considerably. In various species of *Quercus* they run from 1/840 to 1/1400 sq. cm., and in *Syringa vulgaris* from 1/8 to 1/10 sq. cm. In the same species shade leaves have larger chambers than sun leaves. The following trees and shrubs have homobaric leaves: *Evonymus japonica*, *Ilex aquifolium*,

[10] WEHMER, C., Leuchtgaswirkung auf Pflanzen. 4. Die Wirkung des Gases auf das Wurzelsystem von Holz-pflanzen; Ursache der Gaswirkung. Ber. Deutsch. Bot. Gesells. **36**:140–144. 1918.

[11] NEGER, F. W., Die Wegsamkeit der Laubblätter für Gaze. Festschrift zum ERNST STAHL. pp. 152–161. Jena. 1918.